FAA GENERAL AVIATION NEWS

JANUARY 1978

A FLIGHT STANDARDS SAFETY PUBLICATION FOR AIRMEN

A Shower of Snow...

FAA GENERAL AVIATION NEWS

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Brock Adams, *Secretary of Transportation*
Langhorne Bond, *Administrator, FAA*
R. P. Skully, *Director, Flight Standards Service*
Bernard A. Geier, *Chief General Aviation Division*
David Gelfan, *Editor*
Ruth Taksel Benedict, *Associate Editor*
Louise Oertly, *Assistant Editor*

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LOST HORIZONS

"Whiteout" is a term often used by pilots to describe snow conditions when visibility becomes a problem. The Weather Service defines whiteout as "a visibility restricting phenomenon that occurs in the Arctic when a layer of clouds . . . overlies a snow or ice-covered surface. Rays of sunlight are broken up and diffused when passing through the cloud layer, so that they strike the snow surface from many angles. The diffused light then reflects back and forth countless times between the snow and the cloud, eliminating all shadows. The result is a loss of depth perception . . . objects appear to float in the air, and the horizon disappears. Low level flight over icecap terrain or landing on snow becomes dangerous."

But you do not have to fly in the Arctic to experience visibility problems of this kind. The National Transportation Safety Board lists nine accidents in 1976 involving whiteout condition as a cause or factor, most occurring within the adjacent 48 states, or in Alaska south of the 65th parallel. Accidents of this type have been increasing over the past five years. In most cases a VFR flight was proceeding over a frozen lake or open flat area where no contrasting shadows were provided by woodlands or mountain slopes, and where the horizon was obscured by clouds, or light snow showers.

The pilot who elects to continue a flight in VFR conditions over open terrain when the ceilings are low may find himself beset with more problems than he can handle when attempting to maintain his position by visual reference to snow-covered ground. In the absence of a definite horizon, height above ground may be difficult to judge and altitude loss may take place unknowingly unless the pilot monitors his instruments. The recent case of a Michigan pilot who chopped a large hole in Lake Huron with the propeller of his *Comanche* while attempting to hug the surface of the lake in marginal VFR conditions is a good example of what could happen.

History of the Flight

On February 5 at about 0800 EST pilot William L. Gustavson departed Farmington airport near Detroit in a Piper PA-24 (single engine *Comanche*) en route to the City-County Airport at Cheboygan, Michigan, a flight of approximately 215 n.m. Earlier, at 0628 EST, pilot Gustavson had telephoned the FAA Flight Service Station at Detroit and requested a weather briefing, including the en route and terminal forecast for a VFR flight to Cheboygan, with departure time scheduled for "several hours" later that morning. The Air Traffic Specialist on duty later stated that he had provided the pilot with full briefing, after which the pilot acknowledged the marginal VFR conditions The pilot did not file a flight plan. He was not instrument rated. There is no record of any en route radio communications.

At 0915 EST Saginaw Radar observed an aircraft target on a VFR transponder code, approximately 18 miles east of the airport, disappear from the scope. At 1015 EST Saginaw police reported an aircraft down on the ice on Saginaw Bay, with a severely injured pilot who had been transported to a Bay City hospital. The tower informed FAA's Ypsilanti District Office, which carried out the investigation for the Safety Board.

Examination of the Wreckage

The wreckage of the Piper PA-24 was examined in its position on the ice of Saginaw Bay at 1500 EST February 6 by FAA inspectors from the Flight Standards District Office in Ypsilanti (Severe weather conditions prevented an earlier examination.) The aircraft had initially struck the ice in a nose-low (diving) attitude on a northeasterly heading. The auxiliary (outboard) tip tanks on both wings, the leading edges of both wings, and the propeller spinner were all compressed rearward. After initially striking the ice the aircraft bounced up, swung around in a southeasterly direction, and next contacted the ice on its right wing, which fractured and separated. The aircraft rocked over onto the left wing, then nosed-over to an inverted attitude and eventually slid to a stop, on a 330 degree heading. The engine mounts were fractured and the engine had separated from the airframe.

The right wing had fractured and separated at its fuselage attachments and came to rest on top of the left wing, which had partially separated. The fuselage was buckled, but it remained intact as a unit. The pilot seat belt had not failed, but the seat was partially separated from the airframe. A harness restraint had not been installed.

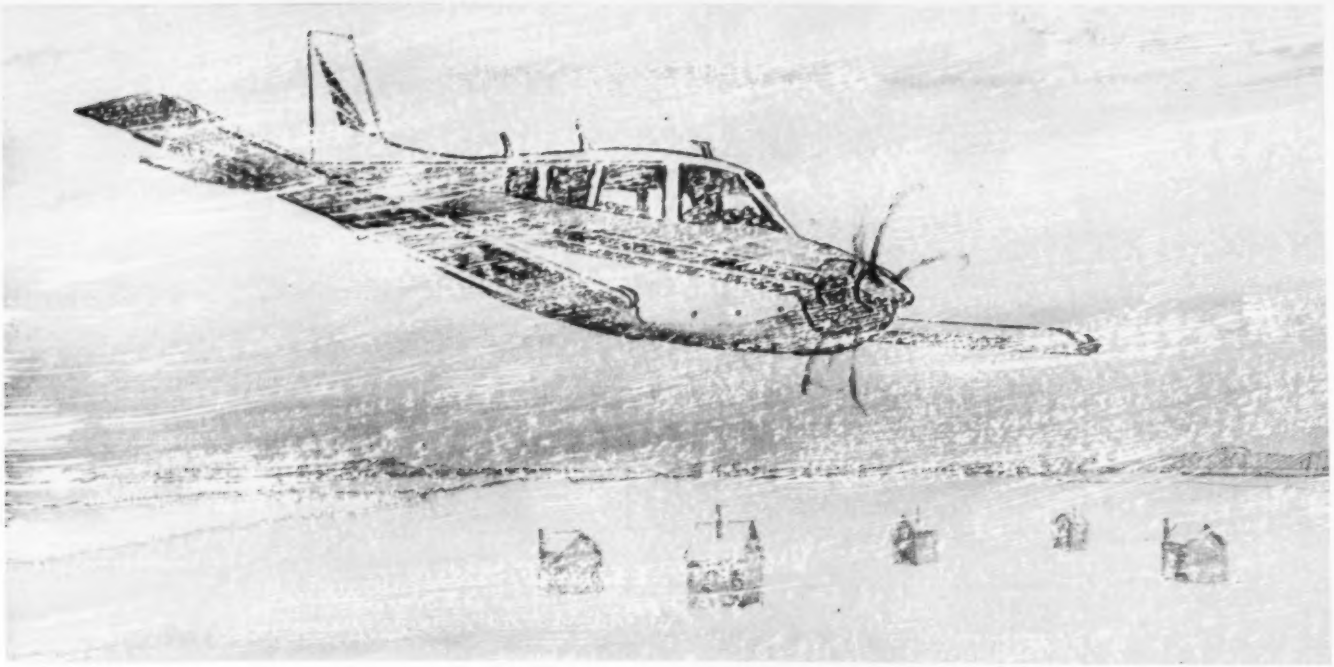
The aircraft was removed from the ice on February 7, and further testing did not reveal any evidence of pre-impact failure or malfunction of the airframe, control system or powerplant.

Crew Information

Pilot William L. Gustavson, age 46, held a private pilot certificate. Up to the time of his accident he had flown a total of 268 hours, of which 115 were in type. He had logged a total of about 20 hours at night and five hours of simulated instrument training. He held a valid Class III medical certificate, with no limitations. He had compiled with FAR 61.57 for the completion of a biennial flight review on the previous November 15.

Aircraft Information

The PA-24 was registered to Gustavson and his wife as co-owners. The single-engine *Comanche* was initially issued an airworthiness certificate on April 10, 1972, and was sold to a series of owners until it was registered to the Gustavsons on May 19, 1974. The most recent annual inspection was conducted two



weeks before the accident on January 22. The aircraft had been given a static system check and the altimeter had been inspected for instrument flight at the time of the annual inspection.

The Accident Site

The aircraft impacted on Saginaw Bay at a point 25 miles north of Bay City, Michigan, and 2 miles south of Point Lookout. The bay was covered with approximately 17 inches of ice at that point, with layer of snow varying from 2 to 8 inches. The shore area west of the crash site is heavily frequented by ice fishermen. The shore line is mainly flat and low. The pilot's route as originally planned from Detroit to Cheboygan would apparently have taken him to the east of Standish City Airport before proceeding north to Cheboygan.

Meteorological Information

The weather in central Michigan on the day of the accident was characterized by a complex series of pressure areas and fronts.

When the pilot contacted the Detroit FSS at 0628 EST he was told that the local weather office was reporting at 0600 EST an overcast cloud layer at 2300 feet, visibility 7 miles, wind south at 6 knots. Scattered rain showers were reported as far north as Saginaw, with some snow showers farther north at Houghton Lake, and Pellston. The system was moving south and easterly across the state. The Saginaw forecast, valid from 0500 to 1200 EST called for scattered cloud layer at 400 feet, overcast ceiling at 3500 feet, visibility 4 miles in fog, with occasional overcast ceilings at 400 feet and visibility 2 miles in light snow and fog.

The briefer at the FSS informed the pilot that precipitation was being caused by "lake effect" (proximity to Lake Huron), and that the forecasts along the proposed route of flight called for "marginal to instrument conditions for the entire day."

The briefer also provided the pilot with the contents of AIRMET Delta 2 which called for instrument weather conditions to spread over upper and east Lake Superior by 1200 EST. Also AIRMET Bravo 2, issued at 0610 EST and valid until 1300 EST, which called for icing conditions, with occasional moderate rime icing in clouds, over Michigan and the upper Great Lakes.

Two ice fishermen at the accident site on Saginaw Bay reported that it had been snowing there for "at least an hour" before the accident. The snow was being blown almost horizontally on Saginaw Bay by winds estimated to have been in excess of 30 knots, according to one of the witnesses.

Statement—Ernie Lowmeyer

(Ernie Lowmeyer, age 19, was ice fishing on the lower part of Saginaw Bay on February 5, in the vicinity of the crash site.)

It was blowing real hard out there—maybe around 30 knots an hour, and snowing off and on. I had brought a little shed out there on my snowmobile, and I had built a fire on the ice to keep warm. I heard that plane before I saw it. It sounded okay but pretty low, I thought maybe they were looking for somebody. A snow squall came over and I lost them.

Next thing, here it comes again, at full throttle, this red and white single-engine plane coming right down through the snow about ten feet off the ice, like it was going to land, only the wheels weren't down. Then bang! It went right into the lake. It must have been about a hundred feet or so away. It hit with a crunch, and bounced up in the air again.

I went down on my knees, and put my gloves over my face, because I thought there was going to be an explosion or something. But it came down again sort of on its side, and then it just slid along until it stopped. I ran over there and found one person in the plane, a man, still strapped in his seat. For a moment I though he was dead, but I heard him groaning.

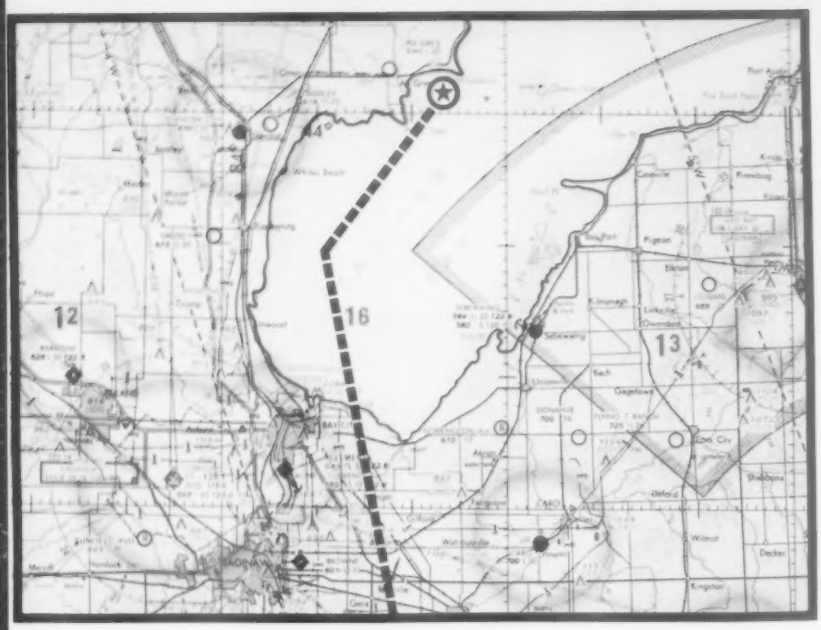
Then another guy who was fishing out there come along. He hadn't seen the accident, but he had heard it. We didn't know whether to leave the guy in the plane, and go for help and come back, or what. We didn't want to move him because we could see his leg was probably broken, but we didn't want to leave him there in the cold any longer than we had to.

By this time the snow was blowing around so thick I could hardly see my shack anymore, and we didn't want to lose him out there, so we lifted him carefully out of the plane and got him in the snowmobile. Later, when we got him on the shore, an ambulance came and took him to the hospital.

Statement—William Gustavson (the pilot)

Mr. Gustavson was interviewed on February 7 in his hospital room at Bay City Medical Center, where he was being treated for fractures of the leg and arm, and severe lacerations. His wife was present at the time. He gave the following information:

The purpose of his flight was to do some ice fishing and to visit some relatives near Cheboygan. He said that he flew up there often, about once every two months, and was familiar with the route. Normally he flew up on the Flint and Saginaw VORs, but he knew the terrain well and on this particular flight, because of the low ceilings, he had chosen to skirt around (to the east) of Saginaw.



LEFT—aircraft flight path over Saginaw Bay on Lake Huron. Ice-fishing pilots who plan to fly home later need to remember that "lake effect" can cause sudden snow showers.

He said that the ceiling was adequate—"at least 2,000 feet—" when he came out over Saginaw Bay, but he was concerned about the visibility up ahead, which appeared to be deteriorating, as he did not pick up the shoreline as soon as anticipated.

He then decided to turn east and follow the coastline of the Lake (Huron) around the Cheboygan, instead of proceeding overland. He felt that this would enable him to fly at a lower altitude and remain VFR without any danger from terrain obstacles or getting lost. He said that he had fuel on board for five hours on takeoff, and estimated at least four hours remaining when he made his decision to alter course.

The pilot acknowledged that the Detroit briefer had called his attention to the marginal weather conditions, and had given him AIRMET Delta 2, which called for IFR weather to prevail over the Lake Superior area by 1000 EST. He believed that Cheboygan was far enough removed from this forecast area to remain VFR.

Asked if he fully understood the significance of an AIRMET, he replied that it was an update concerning some change in the weather forecast that had not been reported in the regular hourly forecast. When informed that it contained information about conditions which might be hazardous to small aircraft, he said that he was aware of this too.

Mr. Gustavson said that he was a careful, experienced pilot who did not take risks. He believed that "freakish winds" over Saginaw Bay were responsible for his accident. He said that he had checked his altitude shortly before the crash, and it was "at least" 700 feet. He presumed that an unexpected windshear had caused him to lose altitude abruptly and come down on the lake.

He acknowledged that he had never flown through snow before and that the first snow shower he encountered en route had given him "a little scare," and that he had become "temporarily disoriented." He insisted that he still had sufficient visibility in all directions but that momentarily he had lost his horizon and ground reference and that if he stared at the snow swirling past the windows it made him "somewhat queasy." But he did not turn back because he felt safer out over the lake where he knew there were no obstacles along the way. He said that he was aware of the elevated cables crossing the inner Bay at an elevation of 1,100 feet.

Asked whether he had any difficulty maintaining visual reference to the lake's surface, he replied in the negative: "at no time." He said that the lake at this point was still frozen over, with a light covering of snow, but he could distinquish it clearly, even during the snow showers. However, he did not remember seeing any ice fishermen or fishing shacks on the lake, and was surprised to learn that he had gone down within 100 feet on a large cluster of shacks. He thought the swirling snow on the surface may have obscured them. He believed that at the point of impact he was north of Point Lookout, and appeared unable to believe that his heading, "10 to 15 degrees" would have taken him overland at the Point.

Asked what his altimeter reading was when he first came out over the lake, he replied, "700 feet." Asked what his actual height over the lake was, he repeated, "700 feet." He was then asked if he knew the elevation of Lake Huron.

He replied, after some hesitation, "About 250 feet."

He added that he "might have" neglected to subtract that figure from his altimeter reading at this point in his flight, and that he could have been down to "about 500 feet over the deck" when the windshear hit.

He was then shown a Detroit sectional chart which gives the elevation of Lake Huron as 580 feet, and he was asked if it were possible that he was only about 100 feet above the lake at the point when he believed he was 700 feet, and that he might not have been able to distinguish the surface because of the swirling snow and the complete absence of any contrasting landscape features. And that he might have descended directly into the lake without perceiving it, while attempting to remain clear of the lowered ceiling.

The pilot said that it was possible.

He asked about the elevation of Lake Ontario (he had learned to fly at Rochester, N.Y.) and was told it was 246 feet. He said that the "unsettling effect" of the snow shower may have mixed up his calculations, although he found it difficult to believe that he could fly directly into a solid surface without seeing it. He felt certain that his visibility was "at least three miles at all times" but added that at times it was like looking through a curtain of feathers—"nothing looked real solid."

The pilot acknowledged that he had taken five hours of instrument training "a long time ago," but did not recall being given any instruction specifically on "white-out" situations. He "supposed" that if he had relied more on his instruments during the last phase of the flight, he might have realized that he was descending toward the surface, but he was not certain. He remembered blinking and squinting repeatedly as he concentrated on keeping his wings and nose level, not wanting to risk a stall at that low altitude "—there was a lot of glare, considering the clouds." The next thing he remembered was the overpowering smell of gasoline in the cockpit of the wrecked airplane, and his fumbling efforts to find and turn off the switches.

Luckily he succeeded. But he got a lot closer to where the fish lived than he had intended.

(Editor's note: accidents described in this magazine are based on investigations conducted by the National Transportation Safety Board. Some details are altered to protect privacy.)

Getting Down To the Nuts and Bolts:

A Reading List

Following is an updated list of selected advisory circulars published by FAA on the subject of aviation airworthiness, maintenance, and engineering, which are sold by the U.S. Government Printing Office. They may be ordered in person or by mail, either from the main office in Washington, DC, or from any bookstore listed on page 7. For best mail handling use a GPO order form or facsimile, print required information, and follow instructions carefully. Do not send cash in the mail. Allow three to six weeks for delivery. Main office: Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

AC Number	Title	Stock Number	Price
20-6BB	**U.S. Civil Aircraft Register** (3 vol. set) *Lists all active U.S. civil aircraft by registration number.*	050-007-00348-0	25.00
20-7N	**General Aviation Inspection Aids** *Selected reports regarding mechanical failures on specific aircraft and aircraft parts provide the aviation community with a means of interchanging maintenance experience that may improve the durability and safety of aeronautical products. Of value to mechanics, operators of repair stations, and others engaged in the inspection, maintenance and operation of aircraft in general. Subscription price includes Annual Summary (published each August) plus supplements each month until new summary is issued.*	050-011-90045-4	9.00
43-3	**Nondestructive Testing in Aircraft** *Reviews the basic principles underlying nondestructive testing.*	050-007-00208-4	.75
43-7	**Ultrasonic Testing for Aircraft** *Describes methods used in ultrasonic nondestructive testing, discusses the many advantages, and points out the simplicity of the tests.*	050-007-00282-3	1.00
43.13-1A	**Acceptable Methods, Techniques and Practices—Aircraft Inspection and Repair** *Contains methods, techniques, and practices acceptable to the Administrator for inspection and repair to civil aircraft.*	050-011-00058-5	3.70
	Change 1—*Transmits new and revised material for basic advisory circular.*	050-007-00294-7	.65
	Change 2—*Transmits revised material concerning aircraft instrument adjustments.*	050-007-00368-4	.35
43.13-2	**Acceptable Methods, Techniques, and Practices—Aircraft Alterations** *Contains methods, techniques, and practices acceptable to the Administrator in altering civil aircraft.*	050-007-99342-1	3.60
60-14	**Aviation Instructor's Handbook** *Provides comprehensive, accurate, and easily understood information on learning and teaching for both flight instructors and aviation maintenance instructors.*	050-011-00072-1	2.75

AC Number	Title	Stock Number	Price
65-2D	**Airframe and Powerplant Mechanics Certification Guide** *Provides information to prospective airframe and powerplant mechanics and other persons interested in FAA certification of aviation mechanics.*	050-007-00331-5	1.30
65-9A	**Airframe and Powerplant Mechanics—General Handbook** *Designed as a study manual for persons preparing for a mechanic certificate with airframe or powerplant ratings. Emphasis in this volume is on theory and methods of application, and is intended to provide basic information on principles, fundamentals, and airframe and powerplant ratings.*	050-007-00379-0	6.75
65-11A	**Airframe and Powerplant Mechanics—Certification Information** *Provides answers to questions most frequently asked about FAA certification of aviation mechanics.*	050-007-00171-1	.40
65-12A	**Airfrace and Powerplant Mechanics—Powerplant Handbook** *Designed to familiarize student mechanics with the construction, theory of operation, and maintenance of aircraft powerplants.*	050-007-00373-1	6.50
65-15A	**Airframe and Powerplant Mechanics—Airframe Handbook** *Designed to familiarize student mechanics with airframe construction, repair, and the operating theory of airframe systems.*	050-007-00391-9	6.00
65-19A	**Inspection Authorization Study Guide** *Provides guidance for persons who conduct annual and progressive inspections and approve major repairs and/or alteration of aircraft. It stresses the importance that certificated mechanics, holding IA's, have in air safety. Primarily intended for mechanics who hold or are preparing to take the test for inspection authorization.*	050-007-00332-3	.65

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GPO Bookstore, Federal Building, Room 190, 915 Second Ave., **Seattle, WA** 98174.

GPO Bookstore, Federal Building, Room 190, 517 E. Wisconsin Avenue, **Milwaukee, WI** 53202.

The
Engine Doctor
talks about

Quick Starts and Slow Burns

Q. Doctor, do you see anything wrong with an engine that starts up at the first flick of the switch in the dead of winter? I mean really cold weather, practically down to zero.

A. Dear me, it sounds more like a blessing than a symptom. What seems to be the problem?

Q. Oh, no problem. Like I said, that old 235 of mine goes off like a bomb, rain, shine or snow, and it's parked outdoors all year. First plane I ever had that didn't have to be hand-cranked, wrapped in a blanket, or otherwise coddled like a kitten before it would start in cold weather. It's just that there's this mechanic out at the field who keeps annoying me with comments on how I'm ruining the engine because I don't rent one of his fancy preheating devices. I know he's just trying to drum up some business, but it bothers me because even though I don't like him (I take my business elsewhere) I've heard he's a pretty sharp old coot. He couldn't be right, could he?

A. Possibly. You know, I'm sure, that 90 percent of engine wear occurs during the first ten seconds of operation, regardless of the season. That is because it takes a few seconds for the oil to be pumped up around the pistons and other working parts. Now if the oil temperature is below what we call the "pour point," it may take quite a bit longer than a few seconds. Meanwhile you have metal wearing on metal, which is not good for the health of your engine.

Q. I thought there was always oil on the moving parts.

A. During periods of rest it tends to drain into the engine sump. Pulling the propeller through a few times—after making certain the ignition switch is in the "off" position—starts the oil circulating without producing much friction on the moving parts.

Q. Okay, but then I don't really need a preheater, do I?

A. That depends on the temperature. If it gets really bitter, say 10 to 15 degrees above zero or less, most engine manufacturers recommend preheating. They want to be certain the oil is really in a fluid state before you fire up.

Q. I've heard that the bush pilots up in Alaska drain their oil after shutdown and keep it in a warm place. I wouldn't have to preheat if I did that, would I?

A. No, but you could contaminate the oil by moving it in and out of the engine, and any dirt is an abrasive inside an engine. And your family might not care for the smell of engine oil in your home. Incidentally, I think you will find that the bush pilots up in the Arctic use a heating device for the engine in addition to warming the oil. Ice cold metal can chill oil as fast as you can pour it in.

Q. What about that electrically heated dipstick I've seen advertised? Would it do?

A. I do not recommend inserting a heated dipstick into a cold mass of oil. According to a Continental engine rep, that could cause moisture to condense in the oil, which, as you know, does your engine no good. Besides, you'd probably warm only a small pocket of oil. This guy does feel the heated dipstick can be useful, if inserted right after shutdown, in keeping the oil warm between flights. But for preheating from scratch you really need something that blows heated air over the metal casing that contains the oil. Preheaters are not all that expensive to rent, you know.

Q. I know, but it's the principle that gets me—I just don't want to do business with this guy, unless I have to. But wait—what about a good hairdryer? That shoots out hot air, and it's portable.

A. Please, be serious. You're going to heat a large 235 hp engine with something that runs on dry cell batteries, in near zero weather?

Q. Is it necessary to heat the whole engine? Isn't it enough to warm up the cylinders?

A. Ideally the **entire aircraft** should be heated. The best heating device is a heated hangar. But for an aircraft parked out in the snow or cold, you have to heat the sump as well as the cylinders. You could heat the cylinders until the gauges hit the redline and still have congealed oil in the crankcase. I can recall an accident that happened just that way. Near Flagstaff, Arizona—gets cold in the desert too. Young fellow with a Pitt Special he'd spent about half his lifetime building. Engine started up like a bomb, as you say, but seized on the climbout. Smashed it to pieces. Inspector told me the oil in the crankcase was like stiff taffy.

Q. I just remembered something. Out on the farm where I grew up we used to run an extension cord to the tractor and keep a 100 watt light bulb burning under the hood all night, with an old horse blanket thrown over the hood. That seemed to help in starting the tractor. Would it work with an airplane?

A. It's not a bad stunt, especially if you are tied down in the country and can run a line out from the barn—and you remember to remove it before starting up. But at an airport the exposed line is too likely to cause trouble underfoot—even assuming you could reach a power source. You ought to investigate your friend's rental heaters.

Q. He's no friend of mine. Maybe I'll buy one. What about changing to a lighter weight oil? Would that help?

A. It might, depending on the kind of oil you use—and the engine, of course. The so-called "ashless dispersant" aviation oils now in general use have a multiple viscosity, like many automotive oils, that give you a wide range. One engine maker, Continental, for example, simply recommends that you use 100 weight oil when the outside temperature is going to be 40°F. or higher, and 65 weight oil when it falls below that. Lycoming essentially says that you can get by all right with A.D. grade 80 as long as the temperature stays above 10°F. and aviation 65 if it drops any lower—with a few exceptions. But if you happen to be using the older, "straight mineral" oils, the acceptable temperature range is going to be smaller, and the pour point generally reached at a higher temperature. Take a look at our chart.

Q. Are aviation oils that much heavier than automobile oil?

A. Not really. For aviation oils, the S.A.E. (Society of Automotive Engineers) rating of the oil is doubled to designate the aviation equivalent, in terms of viscosity. S.A.E. 50 equates to aviation 100, S.A.E. 40 to aviation 80, etc., except that for some odd reason S.A.E. 30 equates to aviation 65.

Q. How do they work out these ratings; has it anything to do with the weight of the oil?

A. No. All they do is count the number of seconds it takes a given quantity of the oil at a standard temperature to run out of a container with a given orifice, or hole. S.A.E. 50 takes 50 seconds, S.A.E. 40 takes 40 seconds, and so on. The pour point is another matter; this is the temperature at which the oil is more or less congealed and will not flow at all. Incidentally, there are important differences in the way aviation and automotive oils are compounded. Never use auto oil in your airplane, or vice versa just because the viscosity is right. It would ruin your engine.

POUR POINTS OF AVIATION OILS

Aviation Grade #	Pour Point
100 Ashless Dispersant	−15°F.
100 Mineral	+10°F.
80 Ashless Dispersant	−15°F.
80 Mineral	+5°F.
65 Ashless Dispersant	−15°F.
65 Mineral	0°F.

Q. What about gasoline? I understand that oil companies make different kinds of gas for cold or warm weather. Do they do that for airplanes?

A. No. What is involved here is the rate at which the fuel vaporizes—which of course must take place before it will burn. The rate of vaporization rises and falls with the ambient temperature, and that is why most gasoline engines are harder, or slower, to start in cold weather.With automobiles, you can counter this by varying the vaporization rate of the fuel you produce for each geographical area, according to the season. But we never do this with Avgas, because aircraft move through a much vaster temperature range in an ordinary flight than cars, and we are chiefly concerned with the danger of vapor lock. If the fuel is too volatile for the temperature, vaporization may take place in the lines, and block the flow—which stops the engine of course. Auto gas is always much more volatile than Avgas.

Q. Which is a good reason for not using it in your airplane, right?

A. Right on. By the way, I'm sure you can understand now why it is important to preheat the cylinder heads and the intake manifold as well as the cylinders—it improves vaporization.

Q. Yes, but I still don't understand why that is a problem with some engines and not with others, like mine, for example.

A. That may be a tribute to you and the way you attend to the manufacturer's recommendations about operating the engine in cold weather, as well as maintaining it properly. But it is also a fact that each type of engine reacts to cold weather somewhat differently. And moreover, the same engine, even brand new, in a different make of aircraft will behave differently.

Q. I don't see how that is possible, if it's the same engine.

A. Well, for one thing, the type of linkage for supplying the fuel, the fuel mixture control, the primer, the boost pump, the starter motor, and so forth are all provided by the airframe manufacturer, and these vary considerably. Also you have to consider the type of cowling, the air intake system, and the propeller. You may have significant variations in the fuel as well. All of these things affect the ability of the engine to start promptly. They are more pronounced in winter, mainly because of the poorer rate of fuel vaporization in cold weather, as I mentioned earlier.

Q. Doesn't the battery have something to do with starting power?

A. Yes, of course. Although I might put it the other way around, and say that if the engine does not start immediately, then you are going to have trouble with continued cranking if your battery is not up to par. The battery, incidentally, is another one of those accessories which is provided by the *airframe* manufacturer, and its useful lifespan will vary according to the climate.

Q. Why is that? I mean, once the engine starts, the battery is recharged back to normal, isn't it?

A. Yes and no. The battery is recharged, under optimum conditions, to its full capacity. But that capacity is diminished somewhat—ever so slightly, but *somewhat*—as the battery is used and as it ages. In other words, a lead-acid battery's capacity diminishes progressively from the day it goes into service, until it is discarded—which is when its capacity becomes too small to do the job.

→

You can understand that, if you remember that this type of battery produces electricity by the action of acid on lead plates, and each time this happens some of the plate material is used up—and this is never restored completely.

Q. I see—and you use up more energy to start in cold weather?

A. Exactly. For example, in zero degree (Fahrenheit) weather, the demand on your battery for starting the engine could be double the requirement in warm weather—even when it starts at the first pop. Obviously your battery will run down much sooner, if you have to continue cranking.

Q. Is that why my handbook tells me not to crank continuously for more than 30 seconds without a rest?

A. That is one of the reasons. Another would be the danger of overheating or burning out your starter motor.

Q. Is there any advantage to disconnecting the battery and keeping it indoors in winter?

A. In some ways, yes. A warmer battery will put out more power. But it is not very convenient, considering the poor accessibility of many aircraft batteries, and you have to be very careful about reconnecting them properly and making certain no corrosion has formed on the exposed areas of the cable clamps. If your battery is carrying a fairly strong charge, it is not likely to freeze up even in the dead of winter. To give you an idea, a fully charged new battery will withstand temperatures of nearly 100 degrees below zero (F.) without freezing.

Q. That's good enough for me. But what about priming? On the plane I used to have, I always got off to a rough start, like the engine was only firing on one or two cylinders. A fellow said it was because I didn't prime it enough, but I didn't want to damage the cylinders.

A. It's true, an excess of gasoline could wash the oil film off the cylinder walls and allow them to be scored by the pistons. All piston-driven engines have to be primed in below-freezing weather. But what you described actually does sound like *over*priming, with some cylinders getting flooded. When you underprime, the engine will usually catch, run briefly and then quit altogether. You want to follow the manufacturer's recommendations very closely here, as everything is tightly calibrated. If the man calls for six strokes of the primer, do not use five, or six and a half.

Q. How fast does the starter have to crank the engine for it to start? Or doesn't that matter?

A. That varies with the aircraft—and possibly the conditions of your magnetos and plugs. But if you continue to crank with the prop barely turning around you could produce moisture condensation, which could freeze on the sparkplugs, shorting them out. Then no amount of cranking will help. You would have to preheat thoroughlly, or pull the plugs and thaw them out.

Q. How?

A. Baking in a slow oven is fine. Some people just sit on them for a while. That works, if you are generously endowed in that region.

Q. Sorry I asked. Say, what about moisture condensing in gas—is that a problem?

A. You can get all kinds of moisture condensation problems in winter, especially when you have bright sunny days that heat up the metal; and cold, freezing nights. Fuel contamination is an obvious concern. Be sure to keep the tanks full between flights to reduce condensation problems. Then you want to make certain you drain the sumps sufficiently during your preflight. Put away your catch-tube and get out a pint or quart jar. And please, don't forget that the freeze-up can take place inside the airplane, too, in the fuel selector mechanism, for example. Pilot I knew made the mistake of running one tank nearly dry before he decided to switch over, at 8,000 feet. Selector wouldn't budge. All that fuel, and no engine. Went down in a half-frozen marsh. Not a pretty sight.

Q. Ugh. I'm getting discouraged about winter flying.

A. No reason to be. Just remember to check out your selector on the ground, and once you're on your way, don't wait too long to change tanks. Not a good idea under any circumstances. And pick a good location.

Q. Anything else?

A. No, it's all just a matter of using common sense. Like scheduling your annual inspectation in the fall, for example, if you are going to do winter flying. Gives you a little edge, especially in starting up, if the engine's been recently tuned. Oh yes, and take along warm clothes, especially boots and mittens.

Q. Is that for the long walk home?

A. Rubbish. It's for being able to stand on an icy surface and pull the prop through, when you can't preheat the start.

Q. How many strokes do you recommend?

A. Just as many as the pilot is up to. It's more of an endeavor than you might imagine. Do make sure the ignition is off, and the airplane is securely tied down. There is no such thing as an absolutely "dead" prop. Fellow I knew once was propping a *Citabria* on a frozen lake near Duluth, no ties, and you would not believe—yes?

Q. Doctor, may we terminate now?

A. Of course. Don't forget the mittens. And a hat. And matches. And—next please. ■

Full preheating of the engine is recommended by *Lycoming* below ten degrees F; by *Continental* below 20 degrees F. Pilots who resort to using auto exhaust for preheating should guard against deadly carbon monoxide fumes which might seep into the cockpit: Allow no one on board the airplane during the preheating, and ventilate the cabin thoroughly before takeoff.

Famous
FLYERS

unflappable

Frank Barr

The ex-cavalryman who made himself at home in the northern bush

On the northwestern tip of Alaska, near the Bering Sea, local postmaster picks up the mail delivered by pilot Frank Barr/inset.

People who lived in small, isolated settlements in Alaska and northwest Canada always considered it a stroke of luck to have a bush pilot grounded by bad weather in their area, especially if they were beset by any mechanical problems. In the early days of flying in Alaska the bush pilot was a reincarnation of the self-sufficient frontiersman who could handle any situation that came his way. He could not only fly in and out of difficult terrain in the worst kind of weather without benefit of prepared landing strips, but he could also patch or repair anything made out of metal, wood, fabric, or wire. Sheer necessity and a desire to survive turned scantily educated men into mechanical wizards who were a boon to the communities they served.

The pilot who could heat-soften and pound a bent propeller back into shape in 50° below weather on a glacier shelf, and fly the airplane off successfully, would find little difficulty in acting temporarily as the local blacksmith, electrician, plumber, midwife, or mechanical engineer. The Alaskan bush attracted the sort of pilots who were above everything else supreme individualists, and it gave them an opportunity to flourish long after such opportunities had disappeared in the Lower Forty-Eight.

One such pilot who will be long remembered is Francis Lucien Barr, better known as Frank, who was born on an Illinois farm in 1903. The restless son of a restless seafaring father, Frank enlisted in the U.S. Cavalry at age 16 and was sent to the Mexican border in Texas to help contain Pancho Villa's forays. In 1922 he re-enlisted in the newly formed U.S. Air Service, but found no opportunity to fly, so he eventually took his discharge and motorcycled to Detroit.

In 1923 Detroit was booming, not only as an automobile center but also as a mecca for would-be aircraft manufacturing tycoons, who were abandoning conventional professions in a frantic effort to become the Henry Ford of the sky. In this climate, Frank Barr found it easy to pick up work of one kind or another around airplanes—including parachuting on Sundays—and to ease his way into the cockpit. Before long he was flying as a test pilot for E. P. Hurd, a local lock manufacturer turned plane designer, and later for Jim Eastman, a former dental-equipment supplier who was building a flying boat.

In 1929 Eastman joined forces with a gold-promoter in a mining venture in northwestern British Columbia near Atlin. All five of Eastman's flying boats were dispatched to the scene, but Barr was bumped from the pilot roster for lack of experience. Stubbornly Frank made his way to Atlin on his own and, after the gold expedition fizzled, found a job flying for Bill Strong, the owner of a trading post who supplied prospectors in the bush hundreds of miles distant. It was on these runs, to the Liard River country of the Yukon, that Barr's reputation for resourcefulness was founded.

Overtaken by nightfall near the Yukon border, Barr put his *Gypsy Moth* down for the night on ice-covered Wolf Lake near a vacant trapper's cabin. He parked the plane on the lee shore of the lake, folded the wings back, and tied it securely to a tree. But during the night a sudden wild storm blew up, with the wind gusts Frank estimated at 90 miles an hour, and when he ventured out in the morning to check on the plane he found a discouraging sight.

The *Moth* had flipped over on its back and was lying in a pool of frozen engine oil. A steel cabane strut (which held the upper wing to the fuselage) was buckled, the plastic windshield was broken and several ribs in the wings were shattered. The fabric covering had been ripped in several places, the top of the rudder was smashed and the propeller had six inches broken off one tip.

Well, this would take some doing, and some time, particularly since Frank could only remove his mitten for a few seconds at a time, in the subzero weather, to start a nut on a bolt. Then he would have to warm his hand at the fire, and always making sure that snow-moistened fingers never came in contact with metal—otherwise they would freeze fast. After some passing Indian trappers helped him remove the wings and roll the plane over, he got to work. It was late November: winter had already set in, and the weather was not likely to improve for six months.

He began with the wing, flattening a gas can and nailing one edge to the top of the wing spar, then curling it over the leading edge and fastening it to the bottom of the spar. He patched the window by drilling holes along both sides of the break and lacing them together. Then, after straightening the cabane strut, he used an axe handle as a splint, tying it with moosehide he got from the Indians. After salvaging the

Moth biplane looking little the worse for wear in Juneau harbor, despite extensive damage from blizzard in the Yukon. Aircraft flew over 200 miles with shortened prop.

oil, which he heated and strained through cloth, he faced the problem of the mangled propeller.

Without special tools he was unable to pull the laminated-wood prop off the engine, so he had to work with it in place. And since there was no prop-balancing machine nearer than Juneau he would have to devise a substitute. He made a paper pattern of the broken tip to give him an idea of where to begin cutting off the good tip. When this "balancing surgery" was accomplished, he smoothed the rough edges and silently pronounced the whole thing fit to fly, as soon as he'd eaten his Christmas Day dinner of boiled rice and sugarless tea.

By this time he had been stranded in the bush for almost six months. During the first few days he had shared his tea and rice with the Indian trappers, but they soon departed on their rounds. An Indian maiden had given Barr indications of her willingness to stay on and make herself useful, but her everpresent aroma of fish oil mixed with various other pungent odors caused him to opt for the solitary life.

When the Indians first left, the silence of the Yukon wild was so everwhelming that "it made his ears ring." But after a while Frank got used to it, and he discovered that solitude had many advantages. For one thing he became acquainted with himself in a way that had never before been possible, and he discovered that he enjoyed his own company. He also found he had a deep reservoir of patience and cheerfulness which were impervious to weather or adversity.

He enjoyed having no one to tell him what to do, or when, or how, and he learned that when he was absolutely on his own he seemed to be able to rise to the occasion admirably. He would never again be touched by fear of the wilderness, because he was no longer afraid of himself. And he had no doubt that the patched-up airplane would fly.

After pouring oil into the engine, which he heated with the gasoline "blowpot," he started up and climbed aboard.

He had to open the throttle all the way to get the plane moving because the shortened propeller was cutting less air than normal. Finally he lifted and was airborne, but with the howling engine and sloppy controls he was not sure that he could get enough altitude to clear the treetops at the end of the five-mile run of the lake. He did —just barely, and made it to Teslin, B.C., for refueling just as his tanks ran dry.

Back in Atlin Barr shrugged off the excitement over his return from the apparent dead, apologized for the delay in delivering Strong's goods, and asked about the next flying job. To everyone's surprise he seemed none the worse for his ordeal.

The *Moth* however was never quite the same again and Strong replaced it with an eight-place Fokker *Amphibian*, which Barr flew on hundreds of business and mercy flights between Juneau, Atlin and the Yukon Territory. Landing on makeshift strips of snow, mud, water or tundra, he had his share of aircraft damage, but he considered this part of the job and would patiently set to work to make repairs on the spot.

One day while flying the Fokker near Atlin he had an engine failure and put the plane down on the nearest lake. He then proceeded to take the engine apart until he found the cause of the failure—a broken cam follower, a small hardened-steel disc. Frank walked back to Atlin, throughtfully. Rather than wait weeks for a replacement part he located an old car axle of the correct diameter, cut off a disc, drilled it and installed it in the airplane. The Fokker flew so well with the homemade disc that it was months before he got around to installing a factorybuilt part.

In 1935, Frank bought a *Pilgrim*, an "oversized Fairchild 71," and brought it to Alaska where he operated under the name of Barr Air Transport. In the dead of winter, he spent a month in a swamp near Mary Joy's Taku Lodge at the mouth of the Taku River after crash-landing in bad weather on wheels. The wheel gear was of no use to him now, so it was time to improvise. Nearby was a farmer's barn, from which he removed some door planks to fashion into skis. He sharpened the tips and wrapped tin around them so they would slide more easily and on top of these contraptions he nailed V-shaped wooden blocks which would act as toe-plates for his wheels.

Barr's *Pilgrim* loading passengers in Juneau, 1933. Unable to use regular airfield owned by competitor, Barr landed on mud flats at low tide.

Fokker *Amphibian* on Stone Lake, Yukon, 1937. Anywhere a prospector wanted to go in the bush, Frank Barr would fly him.

All this was going on under heavy snowfall, so that at take-off time the snow was even with the wings. Barr scooped out a ramp from the plane to the top of the snow, so that he could jockey into position, and packed the runway with his snowshoes down to a patch of ice which he hoped would give him an extra burst of speed. With the temporary skis in place, he opened the throttle and roared across the ice, but when he reached the deep snow the airplane settled nearly out of sight, as the engine died. The fuel tank had gone dry! He had to repeat the entire performance, but on the second try he made it, leaving the skis behind as planned.

He made dozens of forced landings in the bush, but his reputation for always coming back was so remarkable that no one even became concerned unless he was missing more than a month.

In 1938 Barr flew his *Pilgrim*, with his wife and two daughters aboard, north to Fairbanks and flew charters until the war broke out in 1941. Then he took over the grueling Kuskokwim mail run between Fairbanks and Bethel, 650 miles each way, with 26 landing fields that could be anything from gravel bars to river ice to small clearings in the brush. Barr kept the run for five years, then turned to politics, twice winning a seat in the Territorial Senate. In 1954 he served as a delegate to the Constitutional Convention, and then finally retired by moving to Portland, Ore.

He still has his commercial certificate but does not fly much anymore. "I just rent a plane once in a while for fun, but there are too many regulations nowadays."

Frank never made enough money out of flying to worry about, but he says, "I did what I wanted to do. I did it all on my own, and I never lost a passenger." People used to say in jest, "Fly with Barr—if there's no other way."

For him there was no other way. ■

BRIEFS

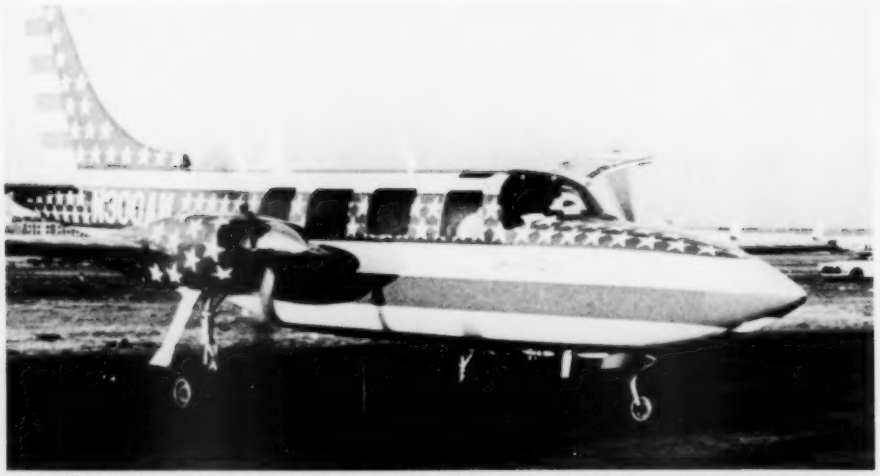
SEARCH AND RESCUE CODE. As of January 1, 1978, aircraft participating in VFR search and rescue missions may be asked to squawk transponder code 1277 when in the search area. The new code is to be used only by authorized search and rescue aircraft that are not under FAA air traffic control and only when operating in a designated search area. Aircraft flying to and from search areas, and those on IFR clearances should squawk the appropriate code as directed by FAA. The use of a specific search and rescue code will enable FAA radar operators to distinguish which planes are on search missions and could also, if a search plane happened to go down, aid in its location.

ATTENTION AG-PLANE PILOTS: A recent forced landing of a Piper Pawnee from an unusual cause has prompted FAA to remind pilots of agricultural aircraft to be careful in their choice of flight clothing. Incident occurred after the aircraft spray pump went dry during a run that was being flown about five feet above the ground. The pilot reached down to close the spray valve lever on the lower side of the cockpit, and as he was bringing his arm up, the sleeve of his special fire-retardant coveralls caught on the throttle, closing it. The unplanned landing followed. Such incidents can be avoided if sleeves are kept cuffed or banded during flight.

REPAIR STATIONS. The directory of all FAA certificated repair stations is now available in an updated version. Included in the book are facilities in the United States and in foreign countries, listed by location. Listings are coded according to ratings, which include Airframe; Powerplant; Propeller; Radio; Instrument; Accessory; and Specialized Service. Further coding reveals more detailed information, such as a manufacturer's maintenance facility, limited ratings, etc. Copies of the publication, "Consolidated Listing of FAA Certified Repair Stations" (AD 140-1J) are free.

HELIPORT DESIGN GUIDE. Persons considering building and marking heliports will be interested in the updated edition of the FAA publication on the subject. The 90-plus page booklet includes recommended separation between helicopter landing area and runway; dimensional criteria for the three classes of non-Federal heliports (public-use; private-use; and personal-use); suggestions for marking of both turf and paved pads; fire protection requirements for ground-level and elevated heliports; design recommendations for off-shore heliports; and marking for hospital heliports. Copies of "Heliport Design Guide" (AC 150/5390-1B) are available free; write to the address listed elsewhere in this column.

Advisory Circulars mentioned in this column, unless otherwise noted, are available free from DOT/FAA Publications Section, TAD-433.1, Washington, D.C. 20590.



THE LONG LEAP. Two American pilots, on their fifth try, returned the around-the-world speed record for piston-powered aircraft to the United States by circling the globe in an *Aerostar* 601P in 104 hours and five minutes. The record flight, which began and ended at Los Angeles International Airport, shaved 18 hours off the previous record held by Australia. (Earlier record flights around the world in less than 100 hours, such as Howard Hughes 1938 flight, are not accepted by the Federation Aeronautique Internationale, which stipulates that the distance flown must be greater than the mileage at the Tropic of Cancer (22,858 miles). At the controls for the 23,000 mile flight were Philander Claxton III, a 31-year-old Washington, D.C. businessman, and Jack Cink, 33, a corporate pilot from Santa Barbara, California.

Light Plane Anti-icing and De-icing Procedures

Concern about an increase in icing accidents in general aviation has led FAA to issue a new advisory circular on the subject. The accident toll suggests a considerable misunderstanding over the difference between airplanes which are approved for flight into icing conditions and those which are not. Some pilots are also unaware of the effects that in-flight ice can have on airplane characteristics and performance.

FAA Regulations specify that before an aircraft is flown into known icing conditions, it must be approved for such flight, which in turn requires that it be equipped with de-ice or anti-ice systems that will adequately protect its various components while operating in icing conditions. De-icer "boots" alone do not meet this requirement.

Furthermore, there is a distinct difference in the functions of de-ice and anti-ice systems, and confusing the two can result in more harm than benefit to the flight. For example, a thin coat of ice may be flexible and inflation of boots may stretch it into a shell within which the boot would be useless. Boots are effective only on ice that is thick enough to be broken. Conversely, anti-ice equipment (including pitot heat) which is designed to prevent ice buildup, may be ineffective if used after heavy ice has formed.

Free copies of "Airplane De-ice and Anti-ice Systems" (AC 91-51) are available from DOT/FAA Publications Section, TAD 443.1, Washington, DC 20590.

November Prefix Dropped

Although the requirement for pilots to use the prefix "November" with their aircraft identification has been eliminated, the long-standing habit is apparently hard to break. FAA's Air Traffic Service would prefer pilots to prefix their number with the make or model of the aircraft and drop the "N": CHEROKEE 8580 ALPHA. Of course if the aircraft registration has a final "N" (8580N) it should not be omitted but used phonetically (NOVEMBER), as with any other letter.

Correct procedures for radio communication and phraseology are found in Airman's Information Manual, Part 1.

Oxygen Proposal Withdrawn

FAA has withdrawn a notice of proposed rulemaking which would have set up certain requirements concerning service and maintenance on aircraft oxygen systems.

The proposal (74-21A) was made in response to a National Transportation Safety Board recommendation resulting from a ground fire which occurred during oxygen system servicing in 1972. It would have prohibited recharging an oxygen cylinder in an aircraft if passengers were on the aircraft, and also prohibited replacement of nonportable oxygen cylinders in aircraft unless specified flight attendants were on board.

A careful review of the operating record shows no fires have occurred during oxygen system servicing of aircraft in passenger-carrying operations in the past five years. This excellent record, FAA believes, is due to increased operator awareness of the need for strict adherence to safe practices and to equipment improvements. FAA has therefore determined that rulemaking is not necessary, and has withdrawn the proposal.

Improving FSS Weather Service

Speedier weather and flight information for pilots flying in the Indiana area may be expected in 1978 when the Indianapolis FSS begins using automated equipment for pilot briefing.

The station will use a computer to collect, process and store a multitude of flight and weather information (including data from radar) which can be called up in seconds by specialists using special keyboards, for display on video screens. The automation eliminates time-consuming clipping and reviewing teletypewriter sheets and other materials, thus cutting down briefing delays during peak hours of demand.

Automated equipment is currently in use at Atlanta and Washington, D.C., flight service stations.

Business and Executive Flying

	Number of Aircraft	Hours Flown (000's)	Miles Flown (000's)
Fixed Wing			
Single Engine Piston	30,096	5,002	599,800
Multi-Engine Piston	13,011	3,182	504,100
Turboprop	1,975	858	162,500
Turbojet	1,582	735	265,300
Helicopter	968	305	30,400
Miscellaneous	204	13	800
TOTAL BUSINESS/EXECUTIVE	47,836	10,095	1,562,900
TOTAL GENERAL AVIATION ACTIVITY	178,304	36,128	4,476,000
PERCENT BUSINESS/EXECUTIVE	26%	27%	34%

BUSINESS FLYING UP. Business and executive flying in 1976 (the latest complete-year figures available) totalled more than 1.5 billion miles—equal to one trip around the earth about every eight minutes. Statistics released recently by FAA indicated the number of general aviation aircraft used principally for business flying increased to approximately 47,800 aircraft, a 6.7 percent gain over the previous year. An additional 24,600 aircraft were used partially for business purposes.

• Ranch Airstrip

I consider your publication one of the best and most informative available and I have just re-subscribed. Perhaps you can answer a question for me.

I own and operate a ranch and occasionally land my airplane on pasture-land at the ranch, but I base it at the nearest airport, fifteen miles away. Since it would be much more convenient if I could keep my airplane at the ranch, I am considering improving a portion of my property to be used as an airstrip. Are there any FAA regulations that would prohibit my constructing a strip for takeoff and landing of my own airplane?

Edwin N. Woods
Santa Maria, Calif.

Federal regulations do not prohibit your building a runway on your property, but you are required to file a "Notice of Landing Area Proposal" (FAA Form 7480-1) with FAA through your local district or regional office 90 days before beginning construction. There may also be local laws concerning zoning, licensing, etc. Since these vary greatly from one state to the next we suggest you contact your state aviation authority for specifics.

A new advisory circular (AC 70-2B) gives complete details on FAA requirements for notice of proposed airstrip construction and use. Copies are available free from DOT Publications Section, TAD 443.1, Washington, D.C. 20590.

• Reserve Fuel Tanks

In your July issue you mention that fuel exhaustion alone accounted for 215 aircraft accidents in 1975 (and possibly a significant number of those 193 accidents in the "cause undetermined" category).

Would not many such fuel exhaustion accidents be prevented if a reserve fuel tank was available in all aircraft? Why haven't the aircraft manufacturers and FAA made the reserve fuel tank (perhaps patterned after the simple Volkswagen reserve tank) mandatory on all aircraft in the interest of safety?

R. Douglas Herr
Kensington, Conn.

Most accidents involving fuel starvation are caused by fuel mismanagement or poor flight planning. For this reason, it is not felt that reserve fuel tanks would solve the problem.

• Right-of-way Responsibility?

I seem to recall being told that when a plane has the right-of-way (is to the right in a converging situation, or is being overtaken) it must maintain speed and heading and possibly altitude. However, FAA regs (Part 91.67) do not state the responsibilities of the plane *with the right-of-way*, as the maritime rules do for a ship with the right-of-way. Please comment.

Also, the cover picture on your July 1977 issue appears to be a shot of the bay or inlet just north of Vancouver, B. C. but I could not find an identification anywhere in the magazine. Can you identify?

D. L. Sherck
New York, N. Y.

The FARs do not clearly spell out the action required of the pilot who legally has the right of way under circumstances such as you describe. However, each person operating an aircraft has the responsibility to see and avoid the other aircraft, by maneuvering if necessary, which could involve changes in either heading, altitude or airspeed.

The July cover photo was taken in Canada at Vancouver Bay, B. C.

• The "Right" Passenger

In your July Forum you published a letter, "The Wright Passenger", from a reader who contradicted your previous article which stated that George Owen Squier was the first military passenger of the Wright brothers. In my estimation the letter should have been captioned the "Right" passenger, for Major Squier (Dr. Squier) was an engineer, scientist and probably the first identifiable aerodynamicist.

In a national magazine dated August 1909 he stated, among other things, that "it appears that the resistance of air to the motion of bodies . . . is a complicated function of the velocity, and is a constant power only through certain limited ranges; in the velocities considered . . . it is approximate to regard the resistance as varying with the square (of the velocity). In fact the law of resistance . . . as experimentally determined is known to vary, not with any constant power of the velocity, but by a range of exponents from the first to the cube . . . "

Major Squier's name has been passed over far too lightly. Wilbur and Orville should have given the Major more attention and less ride.

M. E. Abbott
Seattle, Wash.

We agree that Squier was a remarkable man. See "First Voice in the Sky", March 1977.

• Skin of the Robin

Your October article ("Ole Miss") about the Key brothers included mention of the Curtis *Robin*, which you described as having a high wing with spruce spare and duraluminum skin. I think this is an error. As I recall, the Robin had fabric covered wings.

Russ Carroll
Washington, DC

Right on. According to the 1928 edition of Jane's All the World's Aircraft, the Robin's wings were covered with fabric; it was the ribs in the wing that were aluminum.

FAA GENERAL AVIATION NEWS welcomes comments from our readers. No anonymous letters will be used, but names will be withheld on request. Address: FAA GENERAL AVIATION NEWS, AFS-807, Washington, D.C. 20591.

• Approach Frequency on Charts?

I've noticed some useful changes on sectional charts which I don't remember seeing reported: maximum obstruction altitude instead of highest ground elevation, block altitudes in a heavy format which is easier to find (especially at night) and a code to indicate which VORs broadcast weather.

I'd like to see another: approach control frequencies on charts. I don't like to be "traffic, altitude unknown . . ." which is a little too vague. I'd be glad to advise approach when I'm passing by, if I knew the frequency.

R. E. Cordray
Huntsville, Ala.

Most chart changes were announced in our Aril 1977 issue (see "Chart Symbols, page 11), and in a news item in August.

The question of how much information can be printed on a chart without its becoming too cluttered for usefulness is a perennial problem for chart designers since it is obviously impossible to include everything. Also, regarding approach control, there are often two or more frequencies, each used in a different sector. However, all frequencies are included in Airman's Information Manual, Part 3, which you can consult at any Flight Service Station, and most fixed base operations, if you do not personally subscribe.

INSTRUMENT CORNER

• The Title Tells

In the "Instrument Corner" of your August issue, a reader asked the difference between the VOR-1 and the VOR-A instrument approach procedure. You replied that VOR-A is the current terminology for what used to be called a VOR-1 approach procedure: one where there are only circling minimums.

I enclose for your consideration an approach plate for the VOR-1 Rwy 16 approach at Bellingham, Washington. It is obvious in this case that VOR-1 does not mean "only circling minimums" since this plate has straight-in minimums published. I believe that VOR-1, VOR-2, etc. indicate that more than one approach to the same airport/runway are published, using the same primary navaid.

Robert P. Anderson
Fremont, Calif.

The use of a numerical suffix in an instrument approach title, followed by a runway number (VOR-1 Rwy 15; VOR-2 Rwy 15) indicates there is more than one instrument approach of that type providing straight-in landing minimums to that runway. In these cases the runway number becomes part of the approach procedure title. Approaches titled VOR-A or VOR-B with no runway number indicates only circling minimums are authorized.

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